

WHAT IS CLAIMED IS:

- 1           1.       A method for constructing a packet comprising:  
2           receiving a request to construct one packet, including information on at least one  
3           header and a payload to include in the packet;  
4           generating the at least one header for the received request;  
5           writing the generated at least one header in a first queue;  
6           requesting the payload to include in the packet;  
7           writing the received payload to a second queue;  
8           reading the generated at least one header and payload from the first and second  
9           queues; and  
10          including the read at least one header and payload in the packet..  
  
1           2.       The method of claim 1, further comprising:  
2           transmitting the constructed packet to a target node.  
  
1           3.       The method of claim 1, further comprising:  
2           signaling header complete in response to writing one header to the first queue;  
3           and  
4           signaling payload complete in response to writing the payload to the second  
5           queue.  
  
1           4.       The method of claim 3, wherein the at least one header and payload are  
2           included in the packet in response to receiving signals that all headers for the packet to  
3           construct are written to the first queue and the payload for the packet to construct is  
4           written to the second queue.  
  
1           5.       The method of claim 4, wherein writing the header and signaling header  
2           complete are performed by a header engine, wherein writing the received payload and  
3           signaling payload complete are performed by a payload engine, and wherein including  
4           the read at least one header and payload in the packet are performed by a completion  
5           engine in response to receiving the signals.

1           6.       The method of claim 1, wherein headers and payload for a first packet  
2       may be buffered in the first and second queues before a second packet preceding the first  
3       packet is constructed.

1           7.       The method of claim 1, further comprising:  
2           in response to constructing one packet, determining whether all headers and  
3       payload for a next packet according to a packet ordering are buffered in the first and  
4       second queues; and  
5           constructing the next packet in response to determining that all headers and  
6       payload for the next packet are buffered in the first and second queues.

1           8.       The method of claim 1, further comprising:  
2           accessing the payload from a system memory in response to receiving the request,  
3       wherein the accessed payload is written to the second queue.

1           9.       The method of 1, wherein writing the at least one header to the first queue,  
2       writing the payload to the second queue, and reading the at least one header and payload  
3       from the first and second queues are performed in different clock domains.

1           10.      The method of claim 9, wherein headers are written to the first queue in a  
2       first clock domain, payloads are written to the second queue in a second clock domain,  
3       and headers and payloads are read from the first and second queues, respectively, in a  
4       third clock domain.

1           11.      The method of claim 1, further comprising:  
2           queuing a work request including the request to construct the packet in a send  
3       queue that is in one of a plurality of queue pairs, wherein each queue pair includes one  
4       send queue and one receive queue; and  
5           interpreting the work request to determine the at least one header and payload for  
6       the packet to construct, wherein the determined at least one header is generated and the  
7       determined payload is requested.

1           12.     The method of claim 1, wherein one packet to construct may include at  
2     least one header and no payload, and wherein the at least one generated header is  
3     included in the packet in response to receiving signals indicating that the headers have  
4     been generated and determining that the packet to construct does not include payload.

1           13.     A channel adaptor, wherein the channel adaptor  
2     includes logic to enable the channel adaptor to perform:  
3             receive a request to construct one packet, including information on at least one  
4     header and a payload to include in the packet;  
5             generate the at least one header for the received request;  
6             write the generated at least one header in a first queue;  
7             request the payload to include in the packet;  
8             write the received payload to a second queue;  
9             read the generated at least one header and payload from the first and second  
10    queues; and  
11            include the read at least one header and payload in the packet.

1           14.     The channel adaptor of claim 13, wherein the channel adaptor logic is  
2     further capable of causing the channel adaptor to perform:  
3             transmitting the constructed packet to a target node.

1           15.     The channel adaptor of claim 13, wherein the channel adaptor logic is further  
2     capable of causing the channel adaptor to perform:  
3             signaling header complete in response to writing one header to the first queue;  
4     and  
5             signaling payload complete in response to writing the payload to the second  
6     queue.

1           16.     The channel adaptor of claim 15, wherein the at least one header and  
2     payload are included in the packet in response to receiving signals that all headers for the

3 packet to construct are written to the first queue and the payload for the packet to  
4 construct is written to the second queue.

1 17. The channel adaptor of claim 16, further comprising:  
2 a header engine to perform the operations of writing the header and signaling  
3 header complete;  
4 a payload engine to perform the operations of writing the received payload and  
5 signaling payload complete; and  
6 a completion engine to perform the operations of including the read at least one  
7 header and payload in the packet in response to receiving the signals.

1  
1 18. The channel adaptor of claim 13, wherein headers and payload for a first  
2 packet may be buffered in the first and second queues before a second packet preceding  
3 the first packet is constructed.

1 19. The channel adaptor of claim 13, wherein the channel adaptor logic further  
2 enables the channel adaptor to perform:  
3 in response to constructing one packet, determining whether all headers and  
4 payload for a next packet according to a packet ordering are buffered in the first and  
5 second queues;  
6 constructing the next packet in response to determining that all headers and  
7 payload for the next packet are buffered in the first and second queues.

1 20. The channel adaptor of claim 13, wherein the channel adaptor logic further  
2 enables the channel adaptor to perform:  
3 accessing the payload from a system memory in response to receiving the request,  
4 wherein the accessed payload is written to the second queue.

1           21.     The channel adaptor of 13, wherein writing the at least one header to the  
2     first queue, writing the payload to the second queue, and reading the at least one header  
3     and payload from the first and second queues are performed in different clock domains.

1           22.     The channel adaptor of claim 21 , wherein headers are written to the first  
2     queue in a first clock domain, payloads are written to the second queue in a second clock  
3     domain, and headers and payloads are read from the first and second queues,  
4     respectively, in a third clock domain.

1           23.     The channel adaptor of claim 12, wherein the channel adaptor logic is  
2     further capable of causing the channel adaptor to perform:  
3                 queuing a work request including the request to construct the packet in a send  
4     queue that is in one of a plurality of queue pairs, wherein each queue pair includes one  
5     send queue and one receive queue; and  
6                 interpreting the work request to determine the at least one header and payload for  
7     the packet to construct, wherein the determined at least one header is generated and the  
8     determined payload is requested.

1           24.     A system, comprising:  
2                 a host processor;  
3                 a magnetic storage medium;  
4                 a memory in communication with the host processor and including a payload to  
5     transmit in a packet, wherein a copy of the payload is stored in the magnetic storage  
6     medium; and  
7                 a channel adaptor in communication with the memory, wherein the channel  
8     adaptor includes logic to enable the channel adaptor to perform:  
9                         (i) receiving a request to construct one packet, including information on at  
10     least one header and a payload to include in the packet;  
11                        (ii) generating the at least one header for the received request;  
12                        (iii) writing the generated at least one header in a first queue;  
13                        (iv) requesting the payload to include in the packet;

- 14 (v) writing the received payload to a second queue;
- 15 (vi) reading the generated at least one header and payload from the first
- 16 and second queues; and
- 17 (vii) including the read at least one header and payload in the packet.

1 25. The system of claim 24, wherein headers and payload for a first packet  
2 may be buffered in the first and second queues before a second packet preceding the first  
3 packet is constructed.

1 26. The system of claim 25, wherein the channel adaptor logic further enables  
2 the channel adaptor to perform:  
3 in response to constructing one packet, determining whether all headers and  
4 payload for a next packet according to a packet ordering are buffered in the first and  
5 second queues;  
6 constructing the next packet in response to determining that all headers and  
7 payload for the next packet are buffered in the first and second queues.

1 27. An article of manufacture for constructing a packet, wherein the article of  
2 manufacture is capable of causing operations to be performed, the operations comprising:  
3 receiving a request to construct one packet, including information on at least one  
4 header and a payload to include in the packet;  
5 generating the at least one header for the received request;  
6 writing the generated at least one header in a first queue;  
7 requesting the payload to include in the packet;  
8 writing the received payload to a second queue;  
9 reading the generated at least one header and payload from the first and second  
10 queues; and  
11 including the read at least one header and payload in the packet.

1           28.     The article of manufacture of claim 27, wherein the operations further  
2 comprise:  
3           transmitting the constructed packet to a target node.

1           29.     The article of manufacture of claim 27, wherein the operations further  
2 comprise:  
3           signaling header complete in response to writing one header to the first queue;  
4 and  
5           signaling payload complete in response to writing the payload to the second  
6 queue.

1           30.     The article of manufacture of claim 29, wherein the at least one header and  
2 payload are included in the packet in response to receiving signals that all headers for the  
3 packet to construct are written to the first queue and the payload for the packet to  
4 construct is written to the second queue.

1           31.     The article of manufacture of claim 30, wherein writing the header and  
2 signaling header complete are performed by a header engine, wherein writing the  
3 received payload and signaling payload complete are performed by a payload engine, and  
4 wherein including the read at least one header and payload in the packet are performed by  
5 a completion engine in response to receiving the signals.

1           32.     The article of manufacture of claim 27, wherein headers and payload for a  
2 first packet may be buffered in the first and second queues before a second packet  
3 preceding the first packet is constructed.

1           33.     The article of manufacture of claim 27, wherein the operations further  
2 comprise:  
3           in response to constructing one packet, determining whether all headers and  
4 payload for a next packet according to a packet ordering are buffered in the first and  
5 second queues; and

6           constructing the next packet in response to determining that all headers and  
7           payload for the next packet are buffered in the first and second queues.

1           34.     The article of manufacture of claim 27, wherein the operations further  
2           comprise:

3                 accessing the payload from a system memory in response to receiving the request,  
4           wherein the accessed payload is written to the second queue.

1           35.     The article of manufacture of claim 27, wherein writing the at least one  
2           header to the first queue, writing the payload to the second queue, and reading the at least  
3           one header and payload from the first and second queues are performed in different clock  
4           domains.

1           36.     The article of manufacture of claim 35, wherein headers are written to the  
2           first queue in a first clock domain, payloads are written to the second queue in a second  
3           clock domain, and headers and payloads are read from the first and second queues,  
4           respectively, in a third clock domain.

1           37.     The article of manufacture of claim 27, wherein the operations further  
2           comprise:

3                 queuing a work request including the request to construct the packet in a send  
4           queue that is in one of a plurality of queue pairs, wherein each queue pair includes one  
5           send queue and one receive queue; and

6                 interpreting the work request to determine the at least one header and payload for  
7           the packet to construct, wherein the determined at least one header is generated and the  
8           determined payload is requested.

1           38.     The article of manufacture of claim 27, wherein one packet to construct  
2           may include at least one header and no payload, and wherein the at least one generated  
3           header is included in the packet in response to receiving signals indicating that the



- 4 headers have been generated and determining that the packet to construct does not
- 5 include payload.